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New definition of AKI: shifting the focus beyond mortality

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To the editor,

We read with great interest the recent study [1] by Dr. Machado et al., which proposed a new definition for acute kidney injury (AKI) in critically Ill patients, based on varied urine output thresholds and time frames. This study uses in-hospital mortality as an outcome-oriented approach to compose the proposed UO-AKI classification, applying different time frames (3 h, 6 h, 12 h, and 24 h) and distinct cutoff points. Ultimately, the average UO over 6-h frame was used for the new classification, and AKI was redefined as follows: stage 1 (0.2–0.3 mL/kg/h), stage 2 (0.1–0.2 mL/kg/h), and stage 3 (< 0.1 mL/kg/h) over 6 h. this proposed classification demonstrated superior predictive accuracy over the KDIGO criteria, with improved NRI and IDI for mortality. However, some details need to be considered carefully when interpreting and applying the findings.

First, in the current study, the ability to predict death was used as a criterion to evaluate the quality of AKI criteria. However, the essence of the AKI definition is to reflect impaired excretion of metabolic waste due to damage to the renal tubules and/or renal interstitium. Moreover, not all AKI stages are associated with increased mortality. For instance, in a prospective study [2] including 4683 patients, Kaddourah et al. reported that severe AKI (stage 2–3) conferred an increased risk of death by day 28 after adjustment for 16 covariates while mild AKI stage 1 was not. Similarly, an analysis [3] of two large trials (COVID-19 Critical Care Consortium and LUNG-SAFE studies) showed that both 28-day and 90-day mortality risk was increased for patients with stage 2 (HR 2.00, $p < 0.001$) and stage 3 AKI (HR 1.95, $p < 0.001$), but not for stage 1. Therefore, using a mortality-oriented approach to define AKI may overlook the significance of mild AKI (stage 1) and may explain why the proposed classification's urine volume threshold for AKI stage 1 (0.2–0.3 mL/kg/h) is similar to the stage 3 threshold (0.3 mL/kg/h) in the KDIGO guidelines, albeit with different time frames. Also, this approach could introduce bias into the understanding of AKI's clinical significance, as it focuses solely on the risk of death while neglecting the kidney dysfunction and injury that are essential to the definition of AKI. In addition, we are also somewhat unclear about the time frame definition. Were all time frames measured as the corresponding hours after ICU admission, or were they sliding windows? This distinction may be important for accurately defining AKI.

Finally, we commend Dr. Machado et al. for their significant work, and we hope our perspectives will help in the interpretation of these findings.

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Author contributions
Lihong Zhu raised the question and Juan Lin wrote the letter. All authors have reviewed and approved the letter.

Availability of data and materials
No datasets were generated or analysed during the current study.

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Declarations

Ethics approval and consent to participate
Not applicable.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

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